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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,342	08/22/2001	Hermann Bruggendick	AZ.2673	6856

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EXAMINER	
COCKS, JOSIAH C	

ART UNIT	PAPER NUMBER
3749	

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/856,342	BRUGGENDICK ET AL.	
	Examiner	Art Unit	
	Josiah Cocks	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE filed 3/29/2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-9, 11,12 and 16-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/29/2005 has been entered. As requested the amendment after Final filed 1/24/2005 has also been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 7, 9, 11, 12, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,790,743 to Leikert et al. ("Leikert").

Leikert discloses in Figures 1-3 a method of burning nitrogen containing fuel while reducing the emission of nitrogen oxides as described by applicant's claims 7, 9, 11, 12, and 19. In particular, Leikert shows producing a fuel-rich (i.e. sub-stoichiometric) primary flame core (zones 7 and 8) from all of the fuel supplied to core and primary air and adding a nitrogen oxide reducing agent (via nozzles 4) wherein the agent may consist of coal dust (i.e. a hydrocarbon fuel

and thus a hydrocarbon as claimed) (see col. 2, lines 44-56). Leikert further discloses that the flame core is enveloped with a veil of secondary air (see col. 3, lines 44-60) and the nitrogen reducing agent is introduced together with both primary/core air and with fuel (see col. 3, lines 14-35).

In regard to the limitation that the reducing agent is distributed within the flame core, the examiner considers this limitation met by Leikert. The examiner considers that flame zones (7 and 8) of Leikert taken together are properly considered the flame core recited in applicant's claims. Leikert describes the secondary zone (8) as being "in the vicinity and around the primary flame zone" (see col. 3, lines 34-35). As shown in Fig. 1, the reducing agent supplied via nozzles (4) is clearly distributed within the flame core formed from flame zones (7 and 8). The reduction fuel is described as being uniformly distributed over the cross-section of the combustion chamber (see col. 3, lines 55-60)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leikert as applied to claims 7 and 9 above and further in view of U.S. Patent No. 5,411,394 to Beer et al. ("Beer").

Leikert discloses all the limitations of claims 8 and 9 except possibly a specific recitation of the flame temperature being greater than 1100 °C or a veil of tertiary air around the flame core.

In regard to claim 8, Beer teaches a method of burning nitrogen containing fuel in the same field of endeavor as Leikert wherein the method of Beer acknowledges that low NOx burners using gaseous fuel, coal or fuel oil and forming a fuel-rich flame core having a flame core temperature of 1700 K (approximately 1450 °C or greater). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made that the temperature of the flame core of Leikert would be greater than 1100 °C or greater as taught by Beer et al. as such a temperature range is well known in the art as being desirable for low NOx methods of burning (see Beer, col. 3, lines 34-67).

In regard to claim 18, Beer teaches a method of burning nitrogen containing fuel in the same field of endeavor as Leikert wherein the method of Beer includes a veil of tertiary air enveloping the flame core (see col. 8, lines 21-31 and Fig. 2b). Therefore in regard to claim 10,

it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of Leikert to incorporate the tertiary air veil of Beer as the use of a tertiary air veil is particularly preferred in further assisting in the reduction of NOx production (see col. 8, lines 14-31).

7. Alternatively, claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,790,743 to Leikert et al. ("Leikert") in view of U.S. Patent No. 4,739,713 to Vier et al. ("Vier").

Leikert discloses in Figures 1-3 a method of burning nitrogen containing fuel while reducing the emission of nitrogen oxides substantially as described by applicant's claims 7 and 17. In particular, Leikert shows producing a fuel-rich (i.e. sub-stoichiometric) primary flame core from all of the fuel supplied to core and primary air and adding a nitrogen oxide reducing agent wherein the agent may consist of coal dust (see col. 2, lines 44-56). Leikert further discloses that the flame core is enveloped with a veil of secondary air (see col. 3, lines 44-60) and the nitrogen reducing agent is introduced together with both primary/core air and with fuel (see col. 3, lines 14-35).

In regard to the limitation that the reducing agent is nitrogen, the examiner notes that the title of the Leikert patent is "Method of reducing the NOx-emissions during combustion of *nitrogen-containing fuels*" (emphasis added). The fuel that is being utilized in Leikert is coal dust thus implying that coal dust contains nitrogen and thus the coal dust supplied as a nitrogen oxide reducing agent would qualify as a nitrogen compound as claimed. In further support of this observation, the Vier reference is cited. Vier teaches a coal-dust fired combustion system

in the same field of endeavor as Leikert, wherein Vier specifically discloses the coal dust is known in the art to include nitrogen which is termed "in-fuel" nitrogen (see Vier col. 1, lines 41-45). A person of ordinary skill in the art would therefore recognize that the coal dust of Leikert, which functions as a nitrogen oxide reducing agent, would include nitrogen and is, therefore, a nitrogen compound as claimed.

Further, in regard to the limitation that the nitrogen compound is natural gas or methane, Leikert discloses that the reduction agent may be a "burnable gas" (see col. 2, lines 54-55). The examiner considers that a person of ordinary skill in the art would reasonably consider the selection of a well-known combustible gas such as natural gas or methane as the "burnable gas" to function as the reduction fuel. Alternatively, reference is also made to Vier to support this assertion. In Vier, natural gas is identified as the reducing agent (see Vier, col. 3, lines 37-38). It would have been obvious to a person of ordinary skill in the art at the time the invention as made that the burnable gas of Leikert would be natural gas as identified in Vier as natural gas is well known to desirably serve as a reducing gas in the combustion art.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leikert in view of Vier et al. as applied to claim 7 above, and further in view of U.S. Patent No. 5,809,910 to Svendssen ("Svendssen").

Leikert in view of Vier teach all the limitations of claim 16 except that the nitrogen compound is either ammonia, ammonia water, or urea.

Svendssen teaches a method of burning a fuel and reducing NOx production that is analogous to Leikert. In Svendssen, a reducing agent such as ammonia or urea is added to the fuel (see col. 3, lines 59-67).

Therefore, in regard to claim 16, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the reduction agent of Leikert to be urea or ammonia as taught by Svendssen as these chemicals are recognized in the art as suitable to bring about a desired reduction in NOx production when they added to a fuel for combustion (see Svendssen, col. 3, lines 59-67).

Response to Arguments

9. Applicant's arguments filed 1/24/2005 and entered with the RCE filed 3/29/2005 have been fully considered but they are not persuasive. As noted above, the added limitation that "all of the" fuel is supplied is to form the flame core is met by the fuel supplied to zones (7 and 8). Applicant also argues that the method of supplying a reduction agent shown in Leikert is a conventional "fuel staging" approach where combustion fuel is supplied to a first flame zone (7) and reduction fuel is supplied to a second flame zone (8) that is distinct from applicant's claimed invention of adding fuel and a reducing agent to a flame core.

It is well settled that during patent examination claims are to be given their broadest reasonable interpretation consistent with the underlying specification without reading limitations from the specification into the claims. In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). With this in mind, the examiner maintains his position that, in giving the term "flame core" its broadest reasonable interpretation, the limitation reads on the arrangement

of the flame zones (7 and 8) in Leikert. Further, as applicant notes in his response (see response, pages 5-6) though Leikert terms the reduction agent a "reduction fuel," it functions for a different purpose than the primary fuel, i.e. to reduce NOx emissions in the same manner as applicant's reducing agent. Accordingly, this "reduction fuel" is properly considered to be the reducing agent that is supplied to the flame core as claimed by applicant.

Applicant also argues in the paragraph spanning pages 7 and 8 of the response that applicant's invention is distinct from the prior art because;

> "the reducing agent is not burned at the location in which it is introduced (the sub-stoichiometric primary zone in the form of a flame core) by reason of a lack of oxygen in this sub-stoichiometric primary zone; instead, the reducing agent introduced in the present invention reacts directly with the nitrogen oxides within this sub-stoichiometric primary zone."

However, the examiner notes that limitations limiting a location where the reducing agent is burned, i.e. not at the location in which it is introduced, do not appear in the claims.

Applicant further argues that the teachings of Vier would not prompt a person of ordinary skill in the art to cause a reducing agent to be introduced into the primary flame zone (7) of Leikert. However, Vier has not relied upon by the examiner for such a showing. As noted above, Vier is relied upon to show that a person of ordinary skill in the art would recognize that the coal dust used as the reducing agent in Leikert would include nitrogen and as evidence that a natural gas would be a type of burnable gas identified in Leikert.

Accordingly, applicant's claims are not considered to read over the prior art of record.

Conclusion

10. This action is made non-final. A THREE (3) MONTH shortened statutory period for reply has been set. Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Josiah Cocks whose telephone number is (571) 272-4874. The examiner can normally be reached on weekdays from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus, can be reached at (571) 272-4877. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal/pair. Any questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

jcc
April 28, 2005

JOSIAH COCKS
PRIMARY EXAMINER
ART UNIT 3749